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|---|---|
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| **ART UNIT** | **PAPER NUMBER** |
| 2138 | |

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Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/688,027 | BALL, MATT | |
| | Examiner | Art Unit | |
| | Dipakkumar Gandhi | 2138 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *17 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 October 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to because labels identifying items for different item numbers in figures 1-3 are missing. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Claim Objections*

2. Claim 8 is objected to because of the following informalities: In line 1 of claim 8, "comprises." is incorrect. It should be –comprises:--. Appropriate correction is required.

3. Claim 23 is objected to because of the following informalities: In line 1 of claim 23, "comprises." is incorrect. It should be –comprises:--. Appropriate correction is required.

4. Claim 36 is objected to because of the following informalities: In line 1 of claim 36, "comprises." is incorrect. It should be –comprises:--. Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 1, 2, 3, 4, 20, 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marshall (US 3,860,907) in view of Sellers, Jr. (US 3,508,195).

As per claim 1, Marshall teaches a method of correcting errors in data retrieved from a storage medium, comprising: retrieving a plurality of data blocks from the storage medium; retrieving a plurality of redundancy blocks associated with the plurality of data blocks from the storage medium; determining a number of data blocks with errors from the plurality of data blocks retrieved from the storage medium; determining if the number of data blocks with errors exceeds a number of redundancy blocks retrieved from the storage medium (fig. 2a, 2b, col. 1, lines 8-9, col. 2, line 55 to col. 3, line 3, col. 5, lines 32-39, col. 5, line 54 to col. 6, line 3, Marshall).

However Marshall does not explicitly teach specifically that when the number of data blocks with errors exceeds the number of redundancy blocks, correcting the data blocks in data segments, wherein a data segment includes data from a portion of each of the plurality of data blocks retrieved from the storage medium.

Sellers, Jr. in an analogous art teaches that error location and correction for the block is done by using the VRC (Vertical Redundancy Check) and CRC (Cyclic Redundancy Check) redundancies (col. 1, lines 24-26, Sellers, Jr.). Sellers, Jr. teaches to provide control means for a storage medium enabling error correction of data read from the storage medium (col. 3, lines 14-16, Sellers, Jr.). Sellers, Jr. teaches the operation of reading...special cycle between operations (col. 9, line 45, to col. 10, line 75, Sellers, Jr.).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Marshall's patent with the teachings of Sellers, Jr. by including additionally that when the number of data blocks with errors exceeds the number of redundancy blocks, correcting the data blocks in data segments, wherein a data segment includes data from a portion of each of the plurality of data blocks retrieved from the storage medium.

This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that it would provide the opportunity to correct errors in data blocks when there are more data blocks with errors than the redundancy blocks.

- As per claim 2, Marshall and Sellers, Jr. teach the additional limitations.

Marshall teaches the method, further comprising: when the number of data blocks with errors does not exceed the number of redundancy blocks, correcting the data blocks using the redundancy blocks (col. 2, line 65 to col. 3, line 3, Marshall).

- As per claim 3, Marshall and Sellers, Jr. teach the additional limitations.

Sellers, Jr. teach the method, wherein determining a number of data blocks with errors comprises: retrieving a check sum associated with a retrieved data block from the storage medium; generating a new check sum based on the retrieved data block; and comparing the retrieved check sum with the new check sum to determine if the retrieved data block has errors (col. 7, line 70 to col. 8, line 35, Sellers, Jr.).

- As per claim 4, Marshall and Sellers, Jr. teach the additional limitations.

Sellers, Jr. teach the method, wherein the check sum is a cyclic redundancy code (col. 8, lines 6-9, Sellers, Jr.).

- As per claim 20, Marshall and Sellers, Jr. teach the additional limitations.

Marshall teaches a system of correcting errors in data retrieved from a storage medium, comprising: a data buffer including: a plurality of data blocks retrieved from the storage medium; a plurality of redundancy blocks associated with the plurality of data blocks retrieved from the storage medium; and a processor configured to: determine a number of data blocks with errors from the plurality of data blocks retrieved from the storage medium; determine if the number of data blocks with errors exceeds a number of redundancy blocks retrieved from the storage medium (fig. 2a, 2b, decoder buffer 303 and decoder 304

in fig. 3, col. 1, lines 8-9, col. 2, line 55 to col. 3, line 3, col. 5, lines 32-39, col. 5, line 54 to col. 6, line 3, Marshall).

Sellers, Jr. teach when the number of data blocks with errors exceeds the number of redundancy blocks, correct the data blocks in data segments, wherein a data segment includes data from a portion of each of the plurality of data blocks retrieved from the storage medium (col. 1, lines 24-26, col. 3, lines 14-16, col. 9, line 45, to col. 10, line 75, Sellers, Jr.).

- As per claim 21, Marshall and Sellers, Jr. teach the additional limitations.

Marshall teaches the system, further comprising: when the number of data blocks with errors does not exceed the number of redundancy blocks, correcting the data blocks using the redundancy blocks (col. 2, line 65 to col. 3, line 3, Marshall).

8. Claims 5, 6, 7, 8, 9, 10, 11, 12, 13, 18, 19, 22, 23, 24, 25, 26, 31, 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marshall (US 3,860,907) and Sellers, Jr. (US 3,508,195) as applied to claim 1 above, and further in view of Tenengolts (US 4,782,490).

As per claim 5, Marshall and Sellers, Jr. substantially teach the claimed invention described in claim 1 (as rejected above).

However Marshall and Sellers, Jr. do not explicitly teach the specific use of the method, wherein correcting the data blocks in data segments comprises: for a data segment, a) obtaining syndromes; b) generating an error location polynomial based on the obtained syndromes; c) determining an error location within the data segment using the error location polynomial; d) generating an error value based on the determined error location within the data segment; and e) correcting data at the determined error location within the data segment using the generated error value.

Tenengolts in an analogous art teaches the syndromes...data is corrected (fig. 2, col. 11, line 56 to col. 12, line 46, Tenengolts).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Marshall's patent with the teachings of Tenengolts by including an additional step of using the method, wherein correcting the data blocks in data segments comprises: for a data segment, a) obtaining syndromes; b) generating an error location polynomial based on the obtained syndromes; c) determining

an error location within the data segment using the error location polynomial; d) generating an error value based on the determined error location within the data segment; and e) correcting data at the determined error location within the data segment using the generated error value.

This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that it would provide the opportunity to correct an error in the data segment.

- As per claim 6, Marshall, Sellers, Jr. and Tenengolts teach the additional limitations.

Tenengolts teaches the method, wherein a) further comprising: generating one or more new redundancy blocks based on the retrieved data blocks; generating one or more residual blocks based on the one or more new redundancy blocks and the retrieved redundancy blocks; and for a data segment, generating syndromes based on the one or more residual blocks (encoder/residue generator 112 in fig. 2, col. 10, line 58 to col. 11, line 2, col. 11, lines 24-29, Tenengolts).

- As per claim 7, Marshall, Sellers, Jr. and Tenengolts teach the additional limitations.

Tenengolts teaches the method, further comprising: when the residual blocks for a data segment are zero, determining that there are no errors in the data segment; and repeating a) to e) for another data segment (col. 11, lines 26-32, Tenengolts).

- As per claim 8, Marshall, Sellers, Jr. and Tenengolts teach the additional limitations.

Tenengolts teaches the method, wherein b) comprises: determining if there are less than two errors in the data segment based on the obtained syndromes and coefficients of the error location polynomial (col. 11, line 61 to col. 12, line 5, col. 12, lines 12-25, col. 12, lines 30-32, Tenengolts).

- As per claim 9, Marshall, Sellers, Jr. and Tenengolts teach the additional limitations.

Tenengolts teaches the method; wherein when there are less than two errors in the data segment, determining a first error location within the data segment based on two of the obtained syndromes (col. 12, lines 12-24, Tenengolts).

- As per claim 10, Marshall, Sellers, Jr. and Tenengolts teach the additional limitations.

Tenengolts teaches the method, further comprising: determining a second error location within the data segment based on two of the obtained syndromes, wherein at least one of the two syndromes used to

determine the second error location is different than at least one of the two syndromes used to determine the first error location; and wherein the first error location within the data segment is verified if the first and second error locations are the same (col. 12, lines 12-47, Tenengolts).

- As per claim 11, Marshall, Sellers, Jr. and Tenengolts teach the additional limitations.

Tenengolts teaches the method further comprising: determining a third error location within the data segment based on two of the obtained syndromes, wherein at least one of the two syndromes used to determine the third error location is different than at least one of the two syndromes used to determine the first and the second error locations, and wherein the first error location within the data segment is verified if the first, second, and third error locations are the same (col. 12, lines 12-47, Tenengolts).

- As per claim 12, Marshall, Sellers, Jr. and Tenengolts teach the additional limitations.

Tenengolts teaches the method, wherein the error value is one of the syndromes (col. 11, line 67 to col. 12, line 1, Tenengolts).

- As per claim 13, Marshall, Sellers, Jr. and Tenengolts teach the additional limitations.

Tenengolts teaches the method; wherein when there are two errors in the data segment, solving the error location polynomial using a table (col. 12, lines 51-56, Tenengolts).

- As per claim 18, Marshall, Sellers, Jr. and Tenengolts teach the additional limitations.

Tenengolts teaches the method, wherein e) comprises: multiplying the data at the determined error location with the generated error value to obtain a corrected data for the determined error location (fig. 2, col. 12, lines 27-29, Tenengolts).

- As per claim 19, Marshall, Sellers, Jr. and Tenengolts teach the additional limitations.

Tenengolts teaches the method, further comprising: repeating a) to e) for another data segment (col. 8, lines 30-35, Tenengolts).

- As per claim 22, Marshall, Sellers, Jr. and Tenengolts teach the additional limitations.

Tenengolts teaches the system, wherein the data blocks are corrected in data segments by: for a data segment, a) obtaining syndromes; b) generating an error location polynomial based on the obtained syndromes; c) determining an error location within the data segment using the error location polynomial; d) generating an error value based on the determined error location within the data segment; and e)

correcting data at the determined error location within the data segment using the generated error value (fig. 2, col. 11, line 56 to col. 12, line 46, Tenengolts).

- As per claim 23, Marshall, Sellers, Jr. and Tenengolts teach the additional limitations.

Tenengolts teaches the system, wherein b) comprises: determining if there are less than two errors in the data segment based on the obtained syndromes and coefficients of the error location polynomial (col. 11, line 61 to col. 12, line 5, col. 12, lines 12-25, col. 12, lines 30-32, Tenengolts).

- As per claim 24, Marshall, Sellers, Jr. and Tenengolts teach the additional limitations.

Tenengolts teaches the system wherein when there are less than two errors in the data segment, determining a first error location within the data segment based on two of the obtained syndromes (col. 12, lines 12-24, Tenengolts).

- As per claim 25, Marshall, Sellers, Jr. and Tenengolts teach the additional limitations.

Tenengolts teaches the system wherein the error value is one of the syndromes (col. 11, line 67 to col. 12, line 1, Tenengolts).

- As per claim 26, Marshall, Sellers, Jr. and Tenengolts teach the additional limitations.

Tenengolts teaches the system wherein when there are two errors in the data segment, solving the error location polynomial using a table (col. 12, lines 51-56, Tenengolts).

- As per claim 31, Marshall, Sellers, Jr. and Tenengolts teach the additional limitations.

Tenengolts teaches the system wherein e) comprises: multiplying the data at the determined error location with the generated error value to obtain a corrected data for the determined error location (fig. 2, col. 12, lines 27-29, Tenengolts).

- As per claim 32, Marshall, Sellers, Jr. and Tenengolts teach the additional limitations.

Tenengolts teaches the system further comprising: repeating a) to e) for another data segment (col. 8, lines 30-35, Tenengolts).

9. Claims 14, 15, 16, 17, 27, 28, 29, 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marshall (US 3,860,907), Sellers, Jr. (US 3,508,195) and Tenengolts (US 4,782,490) as applied to claim 8 above, and further in view of Williamson (US 5,905,740).

As per claim 14, Marshall, Sellers, Jr. and Tenengolts substantially teach the claimed invention described in claim 8 (as rejected above). Marshall also teaches two error locations (col. 3, lines 2-3, Marshall). However Marshall, Sellers, Jr. and Tenengolts do not explicitly teach the specific use of the method, wherein when there are two errors in the data segment, solving the error location polynomial using an exhaustive search to determine two error locations within the data segment with errors.
Williamson in an analogous art teaches the error location polynomial...values of the erroneous data (col. 1, lines 57-63, Williamson). Williamson also teaches a Chien search unit 108 for determining the error locations and values (fig. 1, col. 1, line 67 to col. 2, line 1, Williamson). Williamson also teaches that the Chien search technique is advantageous in that it performs an exhaustive search, which can accommodate any number of roots (col. 2, lines 29-31, Williamson).
Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Marshall's patent with the teachings of Williamson by including an additional step of using the method, wherein when there are two errors in the data segment, solving the error location polynomial using an exhaustive search to determine two error locations within the data segment with errors.
This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that it would provide the opportunity to correct double block / code word errors.

- As per claim 15, Marshall, Sellers, Jr., Tenengolts and Williamson teach the additional limitations.

Williamson teaches the method, wherein the exhaustive search is performed at locations in the data segment (col. 2, lines 29-31, Williamson).
Sellers, Jr. teach data blocks indicated by check sums as having errors (col. 8, lines 6-15, Sellers, Jr.).

- As per claim 16, Marshall, Sellers, Jr., Tenengolts and Williamson teach the additional limitations.

Tenengolts teaches when more than two locations in the data segment are found to have error, determining that the data segment is not correctable (col. 5, lines 32-33, Tenengolts).
Williamson teach performing the exhaustive search (col. 2, lines 29-31, Williamson).

- As per claim 17, Marshall, Sellers, Jr., Tenengolts and Williamson teach the additional limitations.

Williamson teaches the method, wherein error values are generated based on the syndromes and the error locations (col. 1, lines 49-63, Williamson).

- As per claim 27, Marshall, Sellers, Jr., Tenengolts and Williamson teach the additional limitations.

Williamson teaches the system wherein when there are errors in the data segment, solving the error location polynomial using an exhaustive search to determine the error locations within the data segment with errors (fig. 1, col. 1, lines 57-63, col. 1, line 67 to col. 2, line 1, col. 2, lines 29-31, Williamson). Marshall teaches two error locations (col. 3, lines 2-3, Marshall).

- As per claim 28, Marshall, Sellers, Jr., Tenengolts and Williamson teach the additional limitations.

Williamson teaches the system wherein the exhaustive search is performed at locations in the data segment (col. 2, lines 29-31, Williamson).

Sellers, Jr. teach data blocks indicated by check sums as having errors (col. 8, lines 6-15, Sellers, Jr.).

- As per claim 29, Marshall, Sellers, Jr., Tenengolts and Williamson teach the additional limitations.

Tenengolts teaches the system wherein when more than two locations in the data segment are found to have error, determining that the data segment is not correctable (col. 5, lines 32-33, Tenengolts). Williamson teach performing the exhaustive search (col. 2, lines 29-31, Williamson).

- As per claim 30, Marshall, Sellers, Jr., Tenengolts and Williamson teach the additional limitations.

Williamson teaches the system, wherein error values are generated based on the syndromes and the error locations (col. 1, lines 49-63, Williamson).

10. Claims 33, 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marshall (US 3,860,907) in view of Sellers, Jr. (US 3,508,195) and He (US 6,845,475 B1).

As per claim 33, Marshall teaches correcting errors in data retrieved from a storage medium, comprising: retrieving a plurality of data blocks from the storage medium; retrieving a plurality of redundancy blocks associated with the plurality of data blocks from the storage medium; determining a number of data blocks with errors from the plurality of data blocks retrieved from the storage medium; determining if the number of data blocks with errors exceeds a number of redundancy blocks retrieved from the storage medium (fig. 2a, 2b, col. 1, lines 8-9, col. 2, line 55 to col. 3, line 3, col. 5, lines 32-39, col. 5, line 54 to col. 6, line 3, Marshall).

However Marshall does not explicitly teach specifically that when the number of data blocks with errors exceeds the number of redundancy blocks, correcting the data blocks in data segments, wherein a data segment includes data from a portion of each of the plurality of data blocks retrieved from the storage medium.

Sellers, Jr. in an analogous art teaches that error location and correction for the block is done by using the VRC (Vertical Redundancy Check) and CRC (Cyclic Redundancy Check) redundancies (col. 1, lines 24-26, Sellers, Jr.). Sellers, Jr. teaches to provide control means for a storage medium enabling error correction of data read from the storage medium (col. 3, lines 14-16, Sellers, Jr.). Sellers, Jr. teaches the operation of reading...special cycle between operations (col. 9, line 45, to col. 10, line 75, Sellers, Jr.).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Marshall's patent with the teachings of Sellers, Jr. by including additionally that when the number of data blocks with errors exceeds the number of redundancy blocks, correcting the data blocks in data segments, wherein a data segment includes data from a portion of each of the plurality of data blocks retrieved from the storage medium.

This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that it would provide the opportunity to correct errors in data blocks when there are more data blocks with errors than the redundancy blocks.

Marshall also does not explicitly teach the specific use of computer-readable storage medium containing computer executable instructions.

He in an analogous art teaches a computer-readable storage medium encoded with a set of computer-executable instructions (col. 10, lines 9-10, He).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Marshall's patent with the teachings of He by including an additional step of using computer-readable storage medium containing computer executable instructions.

This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that using computer-readable

storage medium containing computer executable instructions would provide the opportunity to perform the method automatic, fast and accurately.

- As per claim 34, Marshall, Sellers, Jr. and He teach the additional limitations.

Marshall teaches that when the number of data blocks with errors does not exceed the number of redundancy blocks, correcting the data blocks using the redundancy blocks (col. 2, line 65 to col. 3, line 3, Marshall).

11. Claims 35, 36, 37, 38, 39, 44, 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marshall (US 3,860,907), Sellers, Jr. (US 3,508,195) and He (US 6,845,475 B1) as applied to claim 33 above, and further in view of Tenengolts (US 4,782,490).

As per claim 35, Marshall, Sellers, Jr. and He substantially teach the claimed invention described in claim 33 (as rejected above).

However Marshall, Sellers, Jr. and He do not explicitly teach the specific use of correcting the data blocks in data segments that comprises: for a data segment, a) obtaining syndromes; b) generating an error location polynomial based on the obtained syndromes; c) determining an error location within the data segment using the error location polynomial; d) generating an error value based on the determined error location within the data segment; and e) correcting data at the determined error location within the data segment using the generated error value.

Tenengolts in an analogous art teaches the syndromes...data is corrected (fig. 2, col. 11, line 56 to col. 12, line 46, Tenengolts).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Marshall's patent with the teachings of Tenengolts by including an additional step of correcting the data blocks in data segments that comprises: for a data segment, a) obtaining syndromes; b) generating an error location polynomial based on the obtained syndromes; c) determining an error location within the data segment using the error location polynomial; d) generating an error value based on the determined error location within the data segment; and e) correcting data at the determined error location within the data segment using the generated error value.

This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that it would provide the opportunity to correct an error in the data segment.

- As per claim 36, Marshall, Sellers, Jr., He and Tenengolts teach the additional limitations. Tenengolts teaches that b) comprises: determining if there are less than two errors in the data segment based on the obtained syndromes and coefficients of the error location polynomial (col. 11, line 61 to col. 12, line 5, col. 12, lines 12-25, col. 12, lines 30-32, Tenengolts).

- As per claim 37, Marshall, Sellers, Jr., He and Tenengolts teach the additional limitations. Tenengolts teaches that when there are less than two errors in the data segment, determining a first error location within the data segment based on two of the obtained syndromes (col. 12, lines 12-24, Tenengolts).

- As per claim 38, Marshall, Sellers, Jr., He and Tenengolts teach the additional limitations. Tenengolts teaches that the error value is one of the syndromes (col. 11, line 67 to col. 12, line 1, Tenengolts).

- As per claim 39, Marshall, Sellers, Jr., He and Tenengolts teach the additional limitations. Tenengolts teaches that when there are two errors in the data segment, solving the error location polynomial using a table (col. 12, lines 51-56, Tenengolts).

- As per claim 44, Marshall, Sellers, Jr., He and Tenengolts teach the additional limitations. Tenengolts teaches that e) comprises: multiplying the data at the determined error location with the generated error value to obtain a corrected data for the determined error location (fig. 2, col. 12, lines 27-29, Tenengolts).

- As per claim 45, Marshall, Sellers, Jr., He and Tenengolts teach the additional limitations. Tenengolts teaches repeating a) to e) for another data segment (col. 8, lines 30-35, Tenengolts).

12. Claims 40, 41, 42, 43 rejected under 35 U.S.C. 103(a) as being unpatentable over Marshall (US 3,860,907), Sellers, Jr. (US 3,508,195), He (US 6,845,475 B1) and Tenengolts (US 4,782,490) as applied to claim 36 above, and further in view of Williamson (US 5,905,740).

As per claim 40, Marshall, Sellers, Jr., He and Tenengolts substantially teach the claimed invention described in claim 36 (as rejected above). Marshall also teaches two error locations (col. 3, lines 2-3, Marshall).

However Marshall, Sellers, Jr., He and Tenengolts do not explicitly teach specifically when there are two errors in the data segment, solving the error location polynomial using an exhaustive search to determine two error locations within the data segment with errors.

Williamson in an analogous art teaches the error location polynomial...values of the erroneous data (col. 1, lines 57-63, Williamson). Williamson also teaches a Chien search unit 108 for determining the error locations and values (fig. 1, col. 1, line 67 to col. 2, line 1, Williamson). Williamson also teaches that the Chien search technique is advantageous in that it performs an exhaustive search, which can accommodate any number of roots (col. 2, lines 29-31, Williamson).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Marshall's patent with the teachings of Williamson by including additionally that when there are two errors in the data segment, solving the error location polynomial using an exhaustive search to determine two error locations within the data segment with errors.

This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that it would provide the opportunity to correct double block / code word errors.

- As per claim 41, Marshall, Sellers, Jr., He, Tenengolts and Williamson teach the additional limitations.

Williamson teaches that the exhaustive search is performed at locations in the data segment (col. 2, lines 29-31, Williamson).

Sellers, Jr. teach data blocks indicated by check sums as having errors (col. 8, lines 6-15, Sellers, Jr.).

- As per claim 42, Marshall, Sellers, Jr., He, Tenengolts and Williamson teach the additional limitations.

Tenengolts teaches that when more than two locations in the data segment are found to have error, determining that the data segment is not correctable (col. 5, lines 32-33, Tenengolts).

Williamson teach performing the exhaustive search (col. 2, lines 29-31, Williamson).

- As per claim 43, Marshall, Sellers, Jr., He, Tenengolts and Williamson teach the additional limitations.

Williamson teaches that error values are generated based on the syndromes and the error locations (col. 1, lines 49-63, Williamson).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dipakkumar Gandhi whose telephone number is 571-272-3822. The examiner can normally be reached on 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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